

# **Livestock Trucking Guide**

**By Temple Grandin  
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## **Livestock Management Practices that Reduce Injuries to Livestock During Transport**

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### **It Pays to Reduce Stress**

Each year, thousands of hogs leave the farm, but never reach market. After producers have invested in feed, buildings, medications, equipment and months of care, they perish on the way to market. Many of them could be saved by care in loading, attention to the temperature, a better ride or more careful handling.

Cattle losses during transit are not as great, but more care could reduce shrinkage and help reduce stress related losses. Stresses during handling and transport reduce an animal's ability to fight disease, damage rumen function, and affect reproductive performance. Cattle that are handled quietly have better weight gains and meat quality. They will go back on feed more quickly and have lower shrink losses during transport.

### **Hog Losses**

When hogs are transported long distances, 70 percent of hog transit deaths occur on the truck and the rest after the hogs have reached the market or packing plant. For hogs hauled for a short distance under hot, humid Midwestern conditions, death losses may be split evenly between on the truck or after unloading.

In addition to deaths during transit, about a third as many hogs are crippled during the ride to market, further increasing the transit loss to the industry.

Death losses often double on hot, humid days. Delays in unloading after the hogs reach market are another major cause of hog deaths, especially during hot weather. Rough handling and excessive electric prod use during loading will increase deaths.

### **Hot Weather**

Hot weather and high humidity are deadly to hogs because they lack functioning sweat glands. When the daytime temperature and humidity reach the Alert level on the Livestock Weather Safety Index, deliver hogs to market by 11:00 a.m. When the temperature and humidity reach the Danger level on the Weather Safety Index, haul hogs at night when the combination of temperature and humidity reach the Emergency level, the hottest parts of the day must be avoided. New research at Colorado State University that used death loss statistics from two packing plants indicated that 80° F at 80 percent humidity is the beginning of a severe emergency zone.

- When the temperature is over 60° F use wet sand or wet shavings for bedding.
- Remove plugs and panels from the sides of aluminum trailers.
- Remove grain slats from farm trucks to provide more ventilation.
- Open nose vents for ventilation.
- Load and unload promptly. Heat will build up rapidly inside a vehicle which is standing still. Don't stop at the café and let your hogs roast in the truck. If hogs have to wait in a hot parked trailer, wet them down with a hose.
- If the temperature is 80° F or higher, sprinkle hogs with water immediately after loading. Some trucks have built-in sprinkler systems for hot weather hauling. Keeping hogs cool reduces shrink. Hogs shrink more on hot summer days.
- Never bed with straw during hot weather – wet sand or wet shavings saves hogs.
- The hottest compartment in a semi-trailer is the bottom deck right behind the cab. This compartment has poor air movement.

### **Cold Weather**

Wind chill can kill hogs. They must be protected from the cold wind during truck travel. Exposed hogs in an open truck which is moving down the road at 50 mph with the temperature at 40° F are exposed to a wind chill of 8° F. If the truck is traveling into a head wind, the wind chill effect will be even greater. In the chart below, the wind chill temperatures would be the same for unprotected hogs in a truck moving at the speed indicated for the wind. In an aluminum semi-trailer, a cold wind blowing against the side of the trailer can freeze hogs.

### **Wind Chill Chart**

**[Click here for chart](#)**

- Freezing rain and temperatures around freezing can be deadly. Freezing rain can kill up to half the animals in a truck if it blows in through the sides and soaks the animals.
- Use straw for bedding when the temperature drops below 30° F to keep the hogs warm. In aluminum trailers, straw bedding helps prevent frostbite. During very cold weather below 10° F, bed deeply with straw.
- Replace grain slats in farm trucks to protect the hogs from the cold.
- Close nose vents.
- During winter travel, protect hogs from cold cross winds.
- Plug up half to three quarters of the holes in aluminum trailers or cover with panels.

Hogs need more room in a truck during hot weather. Hogs weighing 200 lbs. need a

ACTUAL AIR TEMPERATURE							
	50	40	30	20	10	0	-10
Wind speed in MPH							
5	48	36	27	17	5	-5	-15
10	40	29	18	5	-8	-20	-30
15	35	23	10	-5	-18	-29	-42
20	32	18	04	-10	-23	-34	-50
25	30	15	-1	-15	-28	-38	-55
30	28	13	-5	-18	-33	-44	-60
35	27	11	-6	-20	-35	-48	-65
40	26	10	-7	-21	-37	-52	-68
45	25	9	-8	-22	-39	-54	-70
50	25	8	-9	-23	-40	-55	-72

minimum of 3.5 square feet per animal. A 250 lb. hog needs up to 5.0 square feet when the humidity is high and the temperature is over 75° F.

The following table provides a rule of thumb guide per running foot of truck floor (based on a 92-inch inside truck width), for varying weights of hogs, when temperatures are below 75° F. When the Livestock Weather Safety Index is in the Alert condition, load 10 to 20 percent fewer hogs. More space is needed for long trips of over three hours. Pigs need room to lie down on long trips. On short trips during cool weather, less space is needed because the pigs remain standing.

**[Click here for Space Requirements](#)**

### **Hog Trucking Tips**

- Use partitions to separate hogs from different farms or different social groups (pens) from the same farm. Fighting between strange hogs is a major cause of death. It can also reduce the quality of the meat by increasing the incidence of PSE (Pale, Soft, Exudative) or DFD (Dark, Firm, Dry) meat.
- When hogs from the same farm have to be mixed, move small groups of 3 to 6 directly from the finishing pens to the truck. Do not store groups of hogs that have been mixed from different pens in alleys or loading chutes. They will fight less if they are mixed on the truck.
- Trucks should be cleaned after each shipment to prevent skin blemishes and to prevent transmission of disease.
- Use partitions to divide the load and stop hogs piling up.
- If hogs will be slaughtered on the same day they are hauled, withhold feed for 6 to 8 hours prior to loading. Hogs with full stomachs are more likely to die during transport. Hogs must be provided with free access to water at all times.
- Encourage drivers to stop and start smoothly to prevent animals from being thrown off their feet. Surveys show careful drivers can greatly reduce death losses.

**[Click here for Livestock Weather Safety Index](#)**

### **Avoid Stress**

The Porcine Stress Syndrome (PSS) is the leading cause of deaths during transport. Hogs with PSS will suddenly lie down, pant and tremble. The skin of white hogs may have a red, splotchy appearance. Hogs showing these symptoms must be allowed to rest or they are likely to die.

Overexertion and heart failure can kill hogs. When a hog's heart starts to race, he will usually lie down, to bring his heart rate down to a safe level. A hog's heart will beat much faster when he is climbing a loading chute, compared with unloading. A hog which has overexerted himself must be allowed to rest. Overexertion is a special problem with confinement hogs. In one study, hogs which were repeatedly shocked with electric prods and handled roughly had five times as many non-ambulatory stressors compared to hogs handled carefully. Both stress carrier and hogs free of the

## MINIMUM HOG SPACE REQUIREMENTS

Ave. Weight	Number Hogs per Running Foot of Tuck Floor (92 inch truck width)
100lbs.	3.3
150	2.6
200	2.2
250	1.8
300	1.6
350	1.4
400	1.2

### Examples (250 lb. hogs):

44 foot trailer -  $44 \times 1.8 = 79$  hogs when temperature is mild. If the Livestock Weather Safety Index is in the Alert range, load 71. If the Weather Safety Index is in the Danger zone, ship only at night and load 63 hogs.

44 foot double-decker trailer -  $88 \times 1.8 = 158$  during mild weather, 142 head if the Weather Safety Index is in the Alert range and 126 head if in the Danger zone.

44 foot possum belly (two 10 foot front decks, three 25 foot middle decks and two 9 foot rear decks, 113 feet of floor space) -  $113 \times 1.8 = 203$  head in mild weather, 183 head when the Index is Alert and 163 head if the index says Danger.

**Measure the compartments in your truck or trailer to determine the lineal feet of floor space, so you can figure loading accurately.**

# LIVESTOCK WEATHER SAFETY INDEX

Relative Humidity Intervals (%)

## How to read this chart

Check a weather forecast for temperature and humidity. Locate the expected temperature in the column on the left. Extend that temperature in a straight line across the chart until it intersects with a line from the expected relative humidity.

Temperatures above 100 degrees F are always DANGER, and if the relative humidity is above 25 percent, the situation is EMERGENCY.

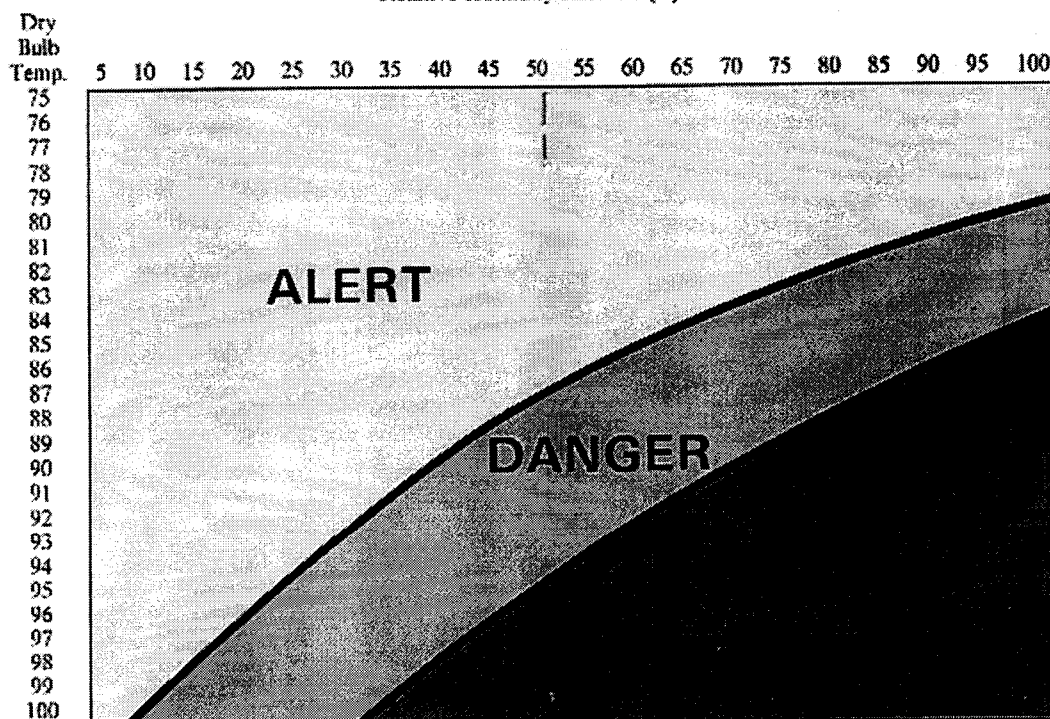
If the intersection of temperature and humidity on the chart is in the ALERT range, load 10 percent fewer hogs (see Hog Loading Guide) and plan to deliver them to market by 11 a.m.

If the index is in the DANGER zone, load 20 percent fewer hogs and haul them at night.

If the index is in the EMERGENCY zone, post-pone hog shipments until weather moderates.

## Livestock Weather Safety Index

Relative Humidity Intervals (%)



stress gene are negatively affected in a similar manner.

Problems with PSS and heart failure are greatest on hot days because the heart rate increases in an effort to get rid of excess heat. Hogs are also more susceptible to PSS when fall and spring temperature widely fluctuate.

If a hog collapses from overexertion or PSS, DON'T throw cold water on it. That will shock its system and may kill it. Instead, wet the ground around the hog to provide cooling evaporation. When the temperature is over 80° F, hogs should be sprinkled with water sprays before they become overheated.

Be careful with electric prods. If a hog is prodded several times in rapid succession with an electric prod, its heart rate will keep increasing and it may have a heart attack and die. Shocking hogs will increase body temperature, open mouth breathing and blood lactate levels. If a hog lies down, DON'T keep prodding it. Some hogs have a very excitable temperament and are difficult to handle. Breeders should select calm stress resistant animals.

## **Cattle and Sheep**

Studies have confirmed that overloading of trucks is a major cause of bruises in horned or tipped cattle. Downed cattle are also more likely to occur on overloaded trucks. Research has shown that the NIAA space guidelines for cattle are the optimal loading density. The following tables show the number of cattle which can be loaded per running foot of truck floor in a truck with a standard 92-inch width. If all the cattle are hornless, 5% more can be loaded. If the load has a few horned or tipped animals, load according to the guidelines. One or two extra horned or tipped animals can cause a great deal of damage if cattle are loaded too tightly.

**[Click here for Truck Space Requirements for Cattle and Sheep](#)**

## **Cattle and Sheep Trucking Tips**

- During hot weather, livestock should be hauled at night or early morning.
- Careful, quiet handling that keeps animals calm will reduce shrink.
- Don't mix strange animals from different pens. Fighting to establish a new social order prior to slaughter can increase the incidence of dark cutting meat in steers. Mixing strange bulls can cause dark cutters within 90 minutes.
- Allow animals which have been dipped to completely dry before loading.
- Shipment of wet animals during cold weather should be avoided to prevent deaths due to wind chill.
- Calves should be vaccinated and pre-weaned before shipment from the ranch of origin. This will reduce sickness and weight loss from transport.

## Truck Space Requirements for Cattle

(Cows, range animals or feedlot animals with horns or tipped horns; for feedlot steers and heifers without horns, increase by 5 percent)

Ave. Weight	Number Cattle per running foot of truck floor (92 in. truck width)
600 lbs.	.9
800	.7
1,000	.6
1,200	.5
1,400	.4

### Examples (1,000 lb. cattle):

44 foot single deck trailer -  $44 \times 0.6 = 26$  head horned, 27 head polled.

44 ft. possum belly (four compartments, 10 ft. front compartment; two middle double decks, 25 ft. each; 9 ft. rear compartment, total of 69 ft. of floor space) -  $69 \times .06 = 41$  head of horned cattle and 43 head of polled cattle.

Measure the total lineal footage of floor space in YOUR truck.

## Truck Space Requirements for Calves

(Applies to all animals in 200 to 450 lb. weight range)

Ave. Weight	Number Calves per running foot of truck floor (92 inch truck width)
200 lbs.	.2
250	1.8
300	1.6
350	1.4
400	1.2
450	1.1

### Examples (450 lb. calves)

44 ft. single deck trailer -  $44 \times 1.1 = 48$  head 44 ft. double deck trailer -  $88 \div 1.1 = 97$  head.

## Truck Space Requirements for Sheep

(Use for slaughter sheep, load 5 percent fewer if sheep have heavy or wet fleeces.)

Ave. Weight	Number Sheep per running foot of truck floor (92-in. truck width)
60 lbs.	3.6
80	3.0
100	2.7
120	2.4
<b>Example (120 lb. sheep)</b>	

44 ft. triple deck trailer -  $44 \times 3 \times 2.4 = 317$  shorn sheep, 302 wooly sheep.



- Don't ship cattle or sheep which are full of green feed.
- Feeder calves should be fed and watered upon arrival. Both feed and water should be available immediately after unloading.
- Non slip truck flooring and an air ride suspension will help reduce stress and shrink.
- Cattle and sheep should have a rest stop if the trip will last more than 48 hours. On long hauls, feeder calves will be less stressed if the trip can be made within 34 hours.
- Do not allow market weight feedlot cattle to stand for long periods in feedlot shipping pens. Too much time off of feed will increase dark cutters.
- Load cattle quietly and move them at a walk or trot. Eliminate electric prods and yelling.
- Smooth starts and stops will help prevent bruises, stress and shrink losses. Poor driving increases shrink.

Sheep that will be traveling less than 8 hours should have feed and water withheld for 15 to 18 hours prior to loading. For trips longer than 8 hours, sheep should be lightly fed 2 to 3 hours before loading. Water should be withheld for several hours. Rest stops for sheep must last at least 8 hours. Unlike cattle, sheep eat before they drink. Short rest stops are detrimental because the sheep will not have time to drink.

### **Shrink and Stress**

Feed and water deprivation does not account for all the stresses placed on an animal during transport. Rumen and immune function (ability to fight disease) are lowered to a greater extent by transport than by feed and water deprivation alone. Cattle traveling on a truck for 8 hours will lose more weight than cattle penned for the same amount of time.

All species of livestock shrink (weight loss) more during hot weather. Two-thirds of shrink is water vapor loss from the lungs. This is why cattle that become excited shrink more. Cattle penned in strange surroundings will shrink more than cattle penned in a familiar pen. Range cattle and sheep not accustomed to people shrink more than animals that are used to people. Habituating livestock to the presence of people may help reduce shrink. Fear during loading and unloading is one of the most stressful parts of the journey. This is especially true for cattle not accustomed to frequent handling. Cattle differentiate between a person on the ground and a person on a horse. On ranches and feedlots, cattle should be exposed to both people on foot and people on horses. They should move quietly among them. This will help prevent problems with "wild" cattle.

Cattle shrink the most during the early stages of a trip. Almost half the shrink of cattle hauled 373 miles was actual carcass shrink (tissue shrink). Providing an animal with water up until the time of transport will help reduce shrink. Be careful not to allow animals to "tank up" shortly before loading. During extremely cold weather, it may be advisable to withhold water for a few hours prior to loading to prevent wind chill caused by animals soiling each other.

Cattle that are not acclimatized to hot temperatures can become severely heat stressed. For example, cattle from a northern area may become heat stressed when they are moved to a warm southern area. Standing in a hot parked truck will be more detrimental to unacclimatized cattle. When animals are moved to an area with a different climate, several weeks are required for the body to adjust. Cold stress is more likely to occur in southern cattle that are moved to the north. Truckers need to be

especially careful to protect unacclimatized cattle from temperature extremes.

### Wind Chill

Even though cattle and sheep have long hair coats or woolly fleeces, they can be subjected to wind chill when they become wet. Wetting the hair coat destroys its ability to insulate the animal from cold. Death losses in cattle are often greatest when the temperature is near freezing and either rain or freezing rain is falling. Dry, cold weather is often less hazardous, because the animal's coat or wool remains dry and retains its ability to insulate.

Wetting a calf has the same effect as lowering the outside temperature by 40 or 50° F.

Death losses during transit of market weight feedlot steers are rare, but death losses can occur during a freezing rain storm. Cattle with sleek summer coats can die from exposure if they moved into a cold area and subjected to wind or freezing rain.

There is no such thing as a single ideal temperature for an animal. The ideal temperature, or thermal neutral zone, in which the animal feels neither hot nor cold, is based on many factors, including wind speed, hair coat length, degree of wetness, condition of the animals and the level of nutrition. You must remember that the amount of hair or wool on an animal will affect its ability to withstand cold.

### Data Sources

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